

**SECTION 104**  
**PREVENTION, CONTROL, AND ABATEMENT OF**  
**EROSION AND WATER POLLUTION**

**104-1 Description.**

Provide erosion control measures on the project and in areas outside the right-of-way where work is accomplished in conjunction with the project, so as to prevent pollution of water, detrimental effects to public or private property adjacent to the project right-of-way and damage to work on the project. Construct and maintain temporary erosion control features or, where practical, construct and maintain permanent erosion control features as shown in the plans or as may be directed by the Engineer.

**104-2 General.**

Coordinate the installation of temporary erosion control features with the construction of the permanent erosion control features to the extent necessary to ensure economical, effective, and continuous control of erosion and water pollution throughout the life of the Contract.

Due to unanticipated conditions, the Engineer may direct the use of control features or methods other than those included in the original Contract. In such event, the Department will pay for this additional work as unforeseeable work.

**104-3 Control of Contractor's Operations Which May Result in Water Pollution.**

Prevent pollution of streams, canals, lakes, reservoirs, and other water impoundments with fuels, oils, bitumens, calcium chloride, or other harmful materials. Also, conduct and schedule operations to avoid or otherwise minimize pollution or siltation of such water impoundments, and to avoid interference with movement of migratory fish. Do not dump any residue from dust collectors or washers into any live stream.

Restrict construction operations in rivers, streams, lakes, tidal waters, reservoirs, canals, and other water impoundments to those areas where it is necessary to perform filling or excavation to accomplish the work shown in the plans and to those areas which must be entered to construct temporary or permanent structures. As soon as conditions permit, promptly clear rivers, streams, and impoundments of all obstructions placed therein or caused by construction operations.

Do not frequently ford live streams with construction equipment. Wherever an appreciable number of stream crossings are necessary at any one location, use a temporary bridge or other structure.

Except as necessary for construction, do not deposit excavated material in rivers, streams, canals, or impoundments, or in a position close enough thereto, to be washed away by high water or runoff.

Where pumps are used to remove highly turbid waters from enclosed construction areas such as cofferdams or forms, treat the water by one or more of the following methods prior to discharge into State waters: pumping into grassed swales or appropriate vegetated areas or sediment basins, or confined by an appropriate enclosure such as turbidity barriers when other methods are not considered appropriate.

Do not disturb lands or waters outside the limits of construction as staked, except as authorized by the Engineer.

Obtain the Engineer's approval for the location of, and method of operation in, borrow pits, material pits, and disposal areas furnished for waste material from the project (other than commercially operated sources) such that erosion during and after completion of the work will not result in probability of detrimental siltation or water pollution.

#### **104-4 Materials for Temporary Erosion Control.**

The Engineer will not require testing of materials used in construction of temporary erosion control features other than as provided for geotextile fabric in 985-3 unless such material is to be incorporated into the completed project. When no testing is required, the Engineer will base acceptance on visual inspection.

The Contractor may use new or used materials for the construction of temporary silt fence, staked turbidity barriers, and floating turbidity barrier not to be incorporated into the completed project, subject to the approval of the Engineer.

#### **104-5 Preconstruction Requirements.**

At the Preconstruction Conference, provide to the Department an Erosion Control Plan meeting the requirements or special conditions of all permits authorizing project construction. If no permits are required or the approved permits do not contain special conditions or specifically address erosion and water pollution, the project Erosion Control Plan will be governed by 7-1.1, 7-2.2, 7-8.1, 7-8.2, and Section 104.

When a DEP generic permit is issued, the Contractor's Erosion Control Plan shall be prepared to accompany the Department's Stormwater Pollution Prevention Plan (SWPPP). Ensure the Erosion Control Plan includes procedures to control off-site tracking of soil by vehicles and construction equipment and a procedure for cleanup and reporting of non-storm water discharges, such as contaminated groundwater or accidental spills. Do not begin any soil disturbing activities until Department approval of the Contractor's Erosion Control Plan, including required signed certification statements.

Failure to sign any required documents or certification statements will be considered a default of the Contract. Any soil disturbing activities performed without the required signed documents or certification statements may be considered a violation of the DEP Generic Permit.

When the SWPPP is required, prepare the Erosion Control Plan in accordance with the planned sequence of operations and present in a format acceptable to the Department. The Erosion Control Plan shall describe, but not be limited to, the following items or activities:

(1) For each phase of construction operations or activities, supply the following information:

- (a) Locations of all erosion control devices
- (b) Types of all erosion control devices
- (c) Estimated time erosion control devices will be in operation
- (d) Monitoring schedules for maintenance of erosion control devices
- (e) Methods of maintaining erosion control devices
- (f) Containment or removal methods for pollutants or hazardous wastes

(2) The name and telephone number of the person responsible for monitoring and maintaining the erosion control devices.

(3) Submit for approval the Erosion Control Plans meeting paragraphs 3a, 3b, or 3c below:

(a) Projects permitted by the Southwest Florida Water Management District (SWFWMD), require the following:

Submit a copy of the Erosion Control Plan to the Engineer for review and to the appropriate SWFWMD Office for review and approval. Include the SWFWMD permit number on all submitted data or correspondence.

The Contractor may schedule a meeting with the appropriate SWFWMD Office to discuss his Erosion Control Plan in detail, to expedite the review and approval process. Advise the Engineer of the time and place of any meetings scheduled with SWFWMD.

Do not begin construction activities until the Erosion Control Plan receives written approval from both SWFWMD and the Engineer.

(b) Projects permitted by the South Florida Water Management District or the St. Johns River Water Management District, require the following:

Obtain the Engineer's approval of the Erosion Control Plan.

Do not begin construction activities until the Erosion Control Plan receives written approval from the Engineer.

(c) Projects authorized by permitting agencies other than the Water Management Districts or projects for which no permits are required require the following:

The Engineer will review and approve the Contractor's Erosion Control Plan.

Do not begin construction activities until the Erosion Control Plan receives written approval from the Engineer.

Comply with the approved Erosion Control Plan.

## **104-6 Construction Requirements.**

**104-6.1 Limitation of Exposure of Erodible Earth:** The Engineer may limit the surface areas of unprotected erodible earth exposed by the construction operation and may direct the Contractor to provide erosion or pollution control measures to prevent contamination of any river, stream, lake, tidal waters, reservoir, canal, or other water impoundments or to prevent detrimental effects on property outside the project right-of-way or damage to the project. Limit the area in which excavation and filling operations are being performed so that it does not exceed the capacity to keep the finish grading, grassing, sodding, and other such permanent erosion control measures current in accordance with the accepted schedule.

Do not allow the surface area of erodible earth that clearing and grubbing operations or excavation and filling operations expose to exceed 750,000 ft<sup>2</sup> without specific prior approval by the Engineer. This limitation applies separately to clearing and grubbing operations and excavation and filling operations.

The Engineer may increase or decrease the amount of surface area the Contractor may expose at any one time.

**104-6.2 Incorporation of Erosion Control Features:** Incorporate permanent erosion control features into the project at the earliest practical time. Use approved temporary erosion control features to correct conditions that develop during construction which were not foreseen at the time of design, to control erosion prior to the time it is practical to construct permanent control features, or to provide immediate temporary control of erosion that develops during normal construction operations, which are not associated with permanent erosion control features on the project.

The Engineer may authorize temporary erosion control features when Topsoil is specified in the Contract and the limited availability of that material from the grading operations will prevent scheduled progress of the work or damage the permanent erosion control features.

**104-6.3 Scheduling of Successive Operations:** Schedule operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations, and the duration of exposure of uncompleted construction to the elements is as short as practicable.

Schedule and perform clearing and grubbing so that grading operations can follow immediately thereafter. Schedule and perform grading operations so that permanent erosion control features can follow immediately thereafter if conditions on the project permit.

**104-6.4 Details for Temporary Erosion Control Features:**

**104-6.4.1 General:** Use temporary erosion and water pollution control features that consist of, but are not limited to, temporary grassing, temporary sodding, temporary mulching, sandbagging, slope drains, sediment basins, sediment checks, berms, baled hay or straw, floating turbidity barrier, staked turbidity barrier and silt fence. For design details for some of these items, refer to the Water Quality Section of the Design Standards.

**104-6.4.2 Temporary Grassing:** The Engineer may designate certain areas of grassing constructed in accordance with Section 570 as temporary erosion control features. The Engineer may direct the Contractor to omit permanent type grass seed from grassing and the reduce the specified rate of spread for fertilizer used in conjunction with grassing operations when such work is designated as a temporary erosion control feature.

**104-6.4.3 Temporary Sod:** Furnish and place sod in accordance with Section 575 within areas designated by the Engineer to temporarily control erosion. If the Engineer determines that the sod will be of a temporary nature, he may not require fertilizer and lime. Keep the sod in a moist condition in order to ensure growth. The Department will pay for all required watering under Item No. 570-9.

**104-6.4.4 Temporary Mulching:** Furnish and apply a 2 to 4 inch thick blanket of straw or hay mulch to designated areas, then mix or force the mulch into the top 2 inches of the soil in order to temporarily control erosion. Use only undecayed straw or hay which can readily be cut into the soil and which otherwise complies with 981-3. The Contractor may substitute other measures for temporary erosion control, such as hydromulching, chemical adhesive soil stabilizers, etc., for mulching with straw or hay, if approved by the Engineer. When beginning permanent grassing operations, plow under temporary mulch materials in conjunction with preparation of the ground.

**104-6.4.5 Sandbagging:** Furnish and place sandbags in configurations to control erosion and siltation.

**104-6.4.6 Slope Drains:** Construct slope drains in accordance with the details shown in the plans, the Design Standards, or as may be approved as suitable to adequately perform the intended function.

**104-6.4.7 Sediment Basins:** Construct sediment basins in accordance with the details shown in the plans, the Design Standards, or as may be approved as suitable to adequately perform the intended function. Clean out sediment basins as necessary in accordance with the plans or as directed.

**104-6.4.8 Berms:** Construct temporary earth berms to divert the flow of water from an erodible surface.

**104-6.4.9 Baled Hay or Straw:** Provide bales having minimum dimensions of 14 by 18 by 36 inches at the time of placement. Construct Baled Hay or Straw dams according to details shown in the plans, as directed by the Project Engineer or as shown in the Design Standards to protect against downstream accumulations of sediment.

Use natural baled hay or straw meeting the requirements of 981-3 or synthetic hay bales may be used as an alternative to natural baled hay or straw. Synthetic hay bales should be interlocking, have pre-made stake holes, are made of synthetic fibers (polypropylene, nylon, polyester) that meet the Environmental Protection Agency's TCLP standards, and produced into a filter medium with needle-punched fibers. Use synthetic hay bales listed on the QPL. Wash out and remove sediment deposits when the deposits reach 1/2 the height of the reusable synthetic hay bale or as directed by the Engineer. Dispose of the washout in accordance with 104-3 or in an area approved by the Engineer. Synthetic hay bales that have had sediment deposits removed may be reinstalled on the project as approved by the Engineer.

**104-6.4.10 Temporary Silt Fences:**

**104-6.4.10.1 General:** Furnish, install, maintain, and remove temporary silt fences, in accordance with the manufacturer's directions, these Specifications, the details as shown on the plans, and the Design Standards.

**104-6.4.10.2 Materials and Installation:** Use a geotextile fabric made from woven or nonwoven fabric, meeting the physical requirements of Section 985 according to those applications for erosion control.

Choose the type and size of posts, wire mesh reinforcement (if required), and method of installation. Do not use products which have a separate layer of plastic mesh or netting. Provide a durable and effective temporary silt fence that controls sediment comparable to the Design Standards, Index No. 102.

Install all sediment control devices in a timely manner to ensure the control of sediment and the protection of lakes, streams, gulf or ocean waters, or any wetlands associated therewith and to any adjacent property outside the right-of-way as required.

At sites where exposure to such sensitive areas is prevalent, complete the installation of any sediment control device prior to the commencement of any earthwork.

After installation of sediment control devices, repair portions of any devices damaged at no expense to the Department.

Erect temporary silt fence at upland locations across ditchlines and at temporary locations shown on the plans or approved by the Engineer where continuous construction activities change the natural contour and drainage runoff. Do not attach temporary silt fence to existing trees unless approved by the Engineer.

**104-6.4.10.3 Inspection and Maintenance:** Inspect all temporary silt fences immediately after each rainfall and at least daily during prolonged rainfall. Immediately correct any deficiencies. In addition, make a daily review of the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, install additional silt fences as directed by the Engineer.

Remove sediment deposits when the deposit reaches approximately 1/2 of the volume capacity of the temporary silt fence or as directed by the Engineer. Dress any sediment deposits remaining in place after the temporary silt fence is no

longer required to conform with the finished grade, and prepare and seed them in accordance with Section 570.

**104-6.4.11 Floating Turbidity Barriers and Staked Turbidity Barriers:**

Install, maintain, and remove turbidity barriers to contain turbidity that may occur as the result of dredging, filling, or other construction activities which may cause turbidity to occur in the waters of the State. The Contractor may need to deploy turbidity barriers around isolated areas of concern such as seagrass beds, coral communities, etc. both within as well as outside the right-of-way limits. The Engineer will identify such areas. Place the barriers prior to the commencement of any work that could impact the area of concern. Install the barriers in accordance with the details shown in the plans or as approved by the Engineer. Ensure that the type barrier used and the deployment and maintenance of the barrier will minimize dispersion of turbid waters from the construction site. The Engineer may approve alternate methods or materials.

Operate turbidity barriers in such a manner to avoid or minimize the degradation of the water quality of the surrounding waters.

**104-6.4.12 Rock Bags:** Furnish and place rock bags to control erosion and siltation. Place the bags as shown in the plans, the Design Standards or as directed by the Engineer. Use a fabric material with openings that are clearly visible to minimize clogging yet small enough to prevent rock loss. Use material of sufficient strength to allow removing and relocating bags without breakage. The bag size when filled with rocks shall be approximately 12 by 12 by 4 inch. Use No. 4 or No. 5 coarse aggregate rock.

**104-6.4.13 Artificial Coverings:**

General: Install artificial coverings in locations where temporary protection from erosion is needed. Two situations occur that require artificial coverings. The two situations have differing material requirements, which are described below.

(1) Use artificial coverings composed of natural or synthetic fiber mats, plastic sheeting, or netting as protection against erosion, when directed by the Engineer, during temporary pauses in construction caused by inclement weather or other circumstances. Remove the material when construction resumes.

(2) Use artificial coverings as erosion control blankets, at locations shown in the plans, to facilitate plant growth while permanent grassing is being established. For the purpose described, use non-toxic, biodegradable, natural or synthetic woven fiber mats. Install in accordance with 571-3 as for plastic erosion mat. Install erosion control blankets capable of sustaining a maximum design velocity of 6.5 ft/sec as determined from tests performed by Utah State University, Texas Transportation Institute or an independent testing laboratory approved by the Department. Furnish to the Engineer, two certified copies of manufacturers test reports showing that the erosion control blankets meet the requirements of this Specification. Certification must be attested, by a person having legal authority to bind the manufacturing company. Also, furnish two 4 by 8 inch samples for product identification. The manufacturers test records shall be made available to the Department upon request. Leave the material in place, as installed, to biodegrade.

**104-6.5 Removal of Temporary Erosion Control Features:** In general, remove or incorporate into the soil any temporary erosion control features existing at the time of construction of the permanent erosion control features in an area of the project in such a manner that no detrimental effect will result. The Engineer may direct that temporary features be left in place.

#### **104-7 Maintenance of Erosion Control Features.**

**104-7.1 General:** Provide routine maintenance of permanent and temporary erosion control features, at no expense to the Department, until the project is complete and accepted. If reconstruction of such erosion control features is necessary due to the Contractor's negligence or carelessness or, in the case of temporary erosion control features, failure by the Contractor to install permanent erosion control features as scheduled, the Contractor shall replace such erosion control features at no expense to the Department. If reconstruction of permanent or temporary erosion control features is necessary due to factors beyond the control of the Contractor, the Department will pay for replacement under the appropriate Contract pay item or items.

Inspect all erosion control features at least once every seven calendar days and within 24 hours of the end of a storm of 0.50 inch or greater. Maintain all erosion control features as required in the Stormwater Pollution Prevention Plan, Contractor's Erosion Control plan and as specified in the State of Florida Department of Environmental Protection Generic Permit for Stormwater Discharge from Large and Small Construction Activities.

**104-7.2 Mowing:** The Engineer may direct mowing of areas within the limits of the project, in addition to and apart from those areas specified in Section 580. Mow these designated areas within seven days of receiving such order. Remove and properly dispose of all litter and debris prior to the mowing operation. Use conventional and specialized equipment along with hand labor to mow the entire area including slopes, wet areas, intersections, overpasses and around all appurtenances. Mow all areas to obtain a uniform height of 6 inches, unless directed otherwise by the Engineer.

#### **104-8 Protection During Suspension of Contract Time.**

If it is necessary to suspend the construction operations for any appreciable length of time, shape the top of the earthwork in such a manner to permit runoff of rainwater, and construct earth berms along the top edges of embankments to intercept runoff water. Provide temporary slope drains to carry runoff from cuts and embankments that are in the vicinity of rivers, streams, canals, lakes, and impoundments. Locate slope drains at intervals of approximately 500 feet, and stabilize them by paving or by covering with waterproof materials. Should such preventive measures fail, immediately take such other action as necessary to effectively prevent erosion and siltation. The Engineer may direct the Contractor to perform, during such suspensions of operations, any other erosion control work deemed necessary.

#### **104-9 Method of Measurement.**

When separate items for temporary erosion control features are included in the Contract, the quantities to be paid for will be: (1) the areas, in square yards, of Artificial Coverings; (2) the area, in acres, of Mowing; including litter, debris removal and disposal, equipment, labor, materials and incidentals; (3) the volume, in cubic yards, of Sandbagging, measured in accordance with 530-4.1; (4) the length, in feet, of Slope Drains (Temporary), measured along the surface of the work constructed; (5) the number of Sediment Basins acceptably constructed; (6) the number of Sediment Basin Cleanouts acceptably accomplished; (7) the number of hay or straw bales; (8) the length, in feet, of Floating Turbidity Barrier; (9) the length, in feet, of Staked Turbidity Barrier; (10) the length, in feet, of Staked Silt Fence; (11) seeding materials in accordance with Section 570 and (12) the number of Rock Bags acceptably placed.

The quantity of floating turbidity barrier, relocated turbidity barrier, staked turbidity barrier, and staked silt fence to be paid for will be the total length, in feet, furnished, installed,

and accepted at a new location, regardless of whether materials are new or used or relocated from a previous installation on the project.

#### **104-10 Basis of Payment.**

Prices and payments will be full compensation for all work specified in this Section, including construction and routine maintenance of temporary erosion control features and for mowing.

Any additional costs resulting from compliance with the requirements of this Section, other than construction, routine maintenance, and removal of temporary erosion control features and mowing, will be included in the Contract unit prices for the item or items to which such costs are related. The work of Grassing or Sodding designated as a temporary erosion control feature in accordance with 104-6.4.2 or 104-6.4.3 will be paid for under the appropriate pay items specified in Sections 570 and 575.

Separate payment will not be made for the cost of constructing temporary earth berms along the edges of the roadways to prevent erosion during grading and subsequent operations. The Contractor shall include these costs in the Contract prices for grading items.

Additional temporary erosion control features constructed as directed by the Engineer will be paid for as unforeseeable work.

In case of repeated failure on the part of the Contractor to control erosion, pollution, or siltation, the Engineer reserves the right to employ outside assistance or to use the Department's own forces to provide the necessary corrective measures. Any such costs incurred, including engineering costs, will be charged to the Contractor and appropriate deductions made from the monthly progress estimate.

Payment will be made under:

Item No. 104- 1-	Artificial Coverings - per square yard.
Item No. 104- 4-	Mowing - per acre.
Item No. 104- 5-	Sandbagging - per cubic yard.
Item No. 104- 6-	Slope Drains (Temporary) - per foot.
Item No. 104- 7-	Sediment Basins - each.
Item No. 104- 9-	Sediment Basin Cleanouts - each.
Item No. 104- 10-	Baled Hay or Straw - each.
Item No. 104- 11-	Floating Turbidity Barrier - per foot.
Item No. 104- 12-	Staked Turbidity Barrier - per foot.
Item No. 104- 13-	Staked Silt Fence - per foot.
Item No. 104- 16-	Rock Bags - each.
Item No. 104- 75-	Relocate Floating Turbidity Barrier - per foot.